

Interactive comment on “Examining the fixation kinetics of chelated and non-chelated copper micronutrient and the applications to micronutrient management in semi-arid alkaline soils” by T. K. Udeigwe et al.

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1 **Influence of humic acid applications on soil physicochemical properties**

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7 **Abstract**

8 Soil structure is often said to be the key to soil productivity since a fertile soil, with desirable
9 soil structure and adequate moisture supply, constitutes a productive soil. Soil structure
10 influences soil water movement and retention, erosion, crusting, nutrient recycling, root
11 penetration and crop yield. The objective of this work is to study, humic acid (HA)
12 application on some physical and chemical properties in weak structured soils investigated.
13 The approach involved establishing a plot experiment in the laboratory conditions. Different
14 rates of HA (control, 0.5%, 1%, 2% and 4%) were applied to soil at three incubation periods
15 (21, 42 and 62 days). At the end of the each incubation period, the changes in
16 physicochemical properties were measured. Generally, HA addition increased EC values at
17 the all incubation periods. HA applications decreased soil modulus of rupture. Application of
18 HA at the rate of 4% was significantly increased soil organic carbon contents. HA
19 applications at the rate of 4% significantly increased both mean soil total nitrogen content and
20 aggregate stability after at three incubation periods ($p < 0.05$). Therefore, HA was potential to
21 improve structure of soil in short term.

22 **Key words:** Aggregate stability, humic acid, soil modulus rupture, soil physicochemical properties, soil structure

23 **1 Introduction**

24 The widespread use of unsuitable and unsustainable production techniques in
25 agricultural systems has resulted in extensive deterioration of soil quality and reductions in
26 soil organic matter content and crop production (Verhulst et al., 2010; Martínez-Blanco et al.,
27 2011). Soil quality is threatened by the increase in human population, by intensive management
28 of cultivable land and by urbanisation and soil degradation. There is a general agreement that
29 soil biochemical, microbiological and biological properties are more than physical and
30 chemical properties for the purpose of estimating alterations in soil quality and hence soil
31 degradation (Keesstra et al., 2012; Paz-Ferreiro and Fu, 2013). Soil organic matter plays an
32 essential role in nutrient (N, P, S, K) cycles, soil stability and the ecological and
33 environmental aspects of sustainability of soil fertility (García-Gil et al., 2004). Turkey soils
34 generally have low organic matter levels and are commonly treated with mineral fertilizers
35 that may improve yield in the short-term, but do not enhance the physical properties of the
36 soil and result in soil degradation over the longer-term. Many regions in Turkey, especially
37 the organic matter content of soils in Central Anatolia has fallen below 2% or 1% (Şeker
38 Karakaplan, 1999).

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Fig. 1.

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